UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
Seattle, WA 98115

Refer to:
2003/01657

June 28, 2004

Mr. Fred P. Patron
Senior Transportation Planning Engineer
Federal Highway Administration, Oregon Division
530 Center Street NE
Salem, Oregon 97301

Re: Endangered Species Act Section 7 Formal Conference and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for the Cow and Quines Creek Bridges Replacement, Douglas County, Oregon

Dear Mr. Patron:

Enclosed is the conference opinion (Opinion) prepared by NOAA's National Marine Fisheries Service (NOAA Fisheries) pursuant to section 7 of the Endangered Species Act (ESA) on the effects of funding the replacement of the Cow and Quines Creek Bridges in Douglas County, Oregon. In this Opinion, NOAA Fisheries concludes that the proposed action is not likely to jeopardize the continued existence of ESA-listed Oregon Coast coho salmon *(Oncorhynchus kisutch*), which are proposed for listing under the ESA. As required by section 7 of the ESA, NOAA Fisheries includes reasonable and prudent measures with nondiscretionary terms and conditions that NOAA Fisheries believes are necessary to minimize the potential for incidental take associated with this action. However, the incidental take statement does not become effective until NOAA Fisheries adopts this Opinion as a biological opinion, after the listing is final. Until the time that the species is listed, the prohibitions of the ESA do not apply. Due to the uncertainty over the listing status of OC coho salmon as a result of various court rulings, an EFH consultation was completed and signed on March 12, 2004. The enclosed Opinion includes an EFH consultation which supercedes the previous EFH consultation.

This document also serves as consultation on essential fish habitat pursuant to section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act and its implementing regulations (50 CFR part 600).

If you have any questions regarding this consultation, please contact Tom Loynes of my staff in the Southwest Oregon Habitat Branch in the Oregon State Habitat Office at 503.231.6892.

Sincerely,

for Michael R Crouse

D. Robert Lohn
Regional Administrator

cc: Frannie Brindle, ODOT
Mark Leedom, ODOT
John Raasch, ODOT

Endangered Species Act - Section 7 Consultation Conference Opinion

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Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation

Cow and Quines Creek Bridges Replacement
Douglas County, Oregon

Agency:	Federal Highway Administration
Consultation Conducted By:	NOAA's National Marine Fisheries Service, Northwest Region
Date Issued:	June 28, 2004
Issued by:	for Michael R Course _____ D. Robert Lohn Regional Administrator
Refer to:	**2003/01657**

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1. INTRODUCTION

1.1 Background

On November 12, 2003, NOAA's National Marine Fisheries Service (NOAA Fisheries) received a biological assessment (BA) and a request from the Federal Highway Administration (FHWA) for Endangered Species Act (ESA) section 7 formal consultation for the Cow and Quines Creek Bridges Replacement Project. The FHWA and the Oregon Department of Transportation (ODOT) propose the replacement of the four bridges that cross Cow and Quines Creeks near the town of Azalea, Oregon. This conference opinion (Opinion) is based on the information presented in the BA and discussions with the applicant.

The FHWA determined that Oregon Coast (OC) coho salmon (*Oncorhynchus kisutch*) may occur within the project area. OC coho salmon were listed as threatened under the ESA on August 10, 1998 (63 FR 42587), and protective regulations were issued under section 4(d) of the ESA on July 10, 2000 (65 FR 42422). The FHWA, using methods described in *Making ESA Determinations of Effect for Individual or Grouped Actions at the Watershed Scale* (NMFS 1996), determined that the proposed action is likely to adversely affect OC coho salmon.

This Opinion is based on the information presented in the BA and developed through correspondence to obtain additional information and clarity. The objective of this Opinion is to determine whether the actions to remove the existing structures and construct new structures are likely to jeopardize the continued existence of OC coho salmon. This consultation is undertaken under section 7(a)(2) of the ESA, and its implementing regulations, 50 CFR Part 402.

1.2 Proposed Action

This project is designed to replace the Cow and Quines Creeks Bridges, which carry vehicle traffic on Interstate 5 (I-5) over Cow and Quines Creeks. I-5 is the major transportation route along the west coast, connecting Washington, Oregon, and California.

The existing northbound (NB) and southbound (SB) Cow Creek bridges are five-span structures, while the Quines Creek bridges are three-span structures. When constructed, these bridges were not designed to carry truck traffic in excess of 80,000 pounds. This has lead to structural cracking. In addition, these bridges have scour issues and deficiencies in bridge rails and transitions.

These bridges will be replaced in stages, with the two structures undergoing construction simultaneously. One corridor of I-5 bridges (NB Cow and NB Quines Creeks, or SB Cow and SB Quines Creeks) would be replaced while traffic is diverted via a crossover onto the other set of structures. Upon completion of the first set of new structures, traffic would be routed onto the new bridges, allowing replacement of the other set of bridges. This type of construction sequencing alleviates the need for detour bridges and reduces construction time.

The most likely staging area would be in the median of I-5. This will allow construction access to all four bridges with minimal impact to I-5 traffic. All construction equipment and materials will be staged a minimum of 150 feet from any waterway.

Stormwater from all four bridges drains directly into Cow and Quines Creeks via scuppers. The new bridges will route the stormwater to the ends of the structures and it will be allowed to drain overland to vegetated areas. This will decrease the amount of pollutants entering Cow and Quines Creeks.

1.2.1 Temporary Work Bridges

Due to the distance between the NB and SB Cow Creek bridges, two temporary work bridges will be required to construct the new Cow Creek structures. The work bridges will most likely be between the existing bridges and will remain in place for the duration of construction. The work bridges will be constructed of piles, pile caps, girders, and decking. Approximately 20 pilings will be within the wetted channel of Cow Creek. To minimize impacts to Cow Creek, the span lengths of the work bridges will be approximately 50 feet, with a width of approximately 26 feet. Pile columns will be either steel H-piles or steel pipe piles, with dimensions ranging from 12 to 24 inches. Once the pile columns and steel cap are connected, the beams and decking will then be placed to finish the work bridges. The deck of the work bridges will be sealed to prevent hazardous materials from entering Cow Creek.

1.2.2 NB Cow Creek Bridge Construction

The existing NB Cow Creek structure will be removed in its entirety before constructing the new NB structure. Bridge demolition and removal work will occur from the existing bridge, roadway approaches, and temporary work bridge. It is likely that the bridge will be saw-cut into smaller pieces and lifted out with a crane. If the footings cannot be removed entirely, they will be removed at least 3 feet below the ground line and back-filled with native material. All work will be isolated from the active flowing stream, and all pollutants and debris will be contained from entering the channel.

The NB Cow Creek Bridge will be a two-span, cast-in-place, post-tensioned box girder structure. Each span will be approximately 124 feet in length, with an overall roadway of 39 feet. The single interior pile-supported bent is to avoid the wetted channel and will be placed on the north bank of Cow Creek. Each end bent and interior ben will be supported on 24- to 36-inch steel pipe pile, with 6 to 10 pilings required at each bent.

Falsework will be required under the NB Cow Creek Bridge during construction. One falsework bent may be required within the normal wetted channel. This bent will be placed along the south edge of the wetted channel and will not obstruct the thalwag. The falsework will consist of 10 to 20 steel-driven piles (12 to 24 inches in diameter), approximately 10 of which will be within the wetted channel. These pilings will be removed upon completion of construction. A sound attenuation device will be used for all piling driven within the wetted channel.

1.2.3 SB Cow Creek Bridge Construction

A temporary work structure will be required for construction of the SB Cow Creek Bridge. The work bridge will be immediately to the west of the existing SB Cow Creek Bridge. Because the wetted channel is too wide to be completely spanned by the work structure, one work structure bent will be placed within the normal wetted channel, resulting in approximately 7 temporary steel pilings within the wetted channel. All of the temporary work bridge pilings will be approximately 12 to 24 inches in diameter, with sound attenuation devices used during the installation of any piling within the wetted channel.

The existing SB Cow Creek structure will also be removed in its entirety before constructing the new SB structure. Bridge demolition and removal work will occur from the existing bridge, roadway approaches, and the temporary work bridge. It is likely that the bridge will be saw-cut into smaller pieces and lifted out with a crane. If the footings cannot be removed entirely they will be removed at least 3 feet below the ground line and back-filled with native material. All work will be isolated from the active flowing stream, and all pollutants and debris will be contained from entering the channel.

The SB Cow Creek Bridge will be a three-span precast girder structure, which will not require falsework piling. The span lengths will be approximately 55.8, 97.6 and 55.8 feet, with an overall width of 39 feet. The two pile-supported interior bents will be within the ordinary high water mark (OHWM), but outside of the low-flow wetted channel. The end bents and interior bent will each be supported on 24- to 36-inch steel pipe pile, with 6 to 10 pilings required at each bent. It is not anticipated that there will be any work within the wetted channel associated with the construction of the SB Cow Creek Bridge.

1.2.4 Quines Creek Bridges

The existing Quines Creek Bridges are three-span structures with both interior footings within the normal wetted channel. To minimize the potential for bridge scour, the replacement Quines Creek Bridges will be single-span structures, fully spanning the OHWM elevation of Quines Creek.

Minor impacts to riparian vegetation will occur due to construction access. Several mature trees may need to be limbed to allow placement of the new beams. Additionally, approximately four mature deciduous trees and numerous small shrubs may need to be removed from the median area. This area will be restored and replanted with appropriate native species following completion of construction activities.

No temporary work bridges will be necessary for construction or demolition operations at Quines Creek. During demolition and construction heavy equipment will operate from the existing structure and roadway approaches. In-water work activities within Quines Creek will primarily be limited to removing the existing interior bents and riprap. During demolition all debris will be contained from entering the channel.

The Quines Creek Bridges will be a pre-cast, box beam bridge with a cast-in-place composite concrete deck, approximately 83.6 feet long and 52.9 feet wide. Both replacement structures will carry three lanes, two mainline, and one lane from the nearby on- and off-ramps. In addition, there will not be any in-water work associated with the construction of the new Quines Creek Bridges.

2. ENDANGERED SPECIES ACT

2.1 Conference Opinion

2.1.1 Biological Information

Within the Cow Creek watershed, NOAA Fisheries listed the OC coho salmon as threatened under the ESA on August 10, 1998 (63 FR 42587). Protective regulations were issued under section 4(d) of the ESA on July 10, 2000 (65 FR 42422).

In September 2001, in the case *Alsea Valley Alliance v. Evans*, U.S. District Court Judge Michael Hogan struck down the 1998 ESA listing of OC coho salmon and remanded the listing decision to NOAA Fisheries for further consideration. In November 2001, the Oregon Natural Resources Council appealed the District Court's ruling. Pending resolution of the appeal, in December 2001, the Ninth Circuit Court of Appeals stayed the District Court's order that voided the OC coho listing. While the stay was in place, the OC coho Evolutionarily Significant Unit (ESU) was again afforded the protections of the ESA.

On February 24, 2004, the Ninth Circuit dismissed the appeal in *Alsea*. On June 15, 2004, the Ninth Circuit returned the case to Judge Hogan and ended its stay. Judge Hogan's order invalidating the OC coho listing is back in force. Accordingly, OC coho are now not listed, and ESA provisions for listed species, such as the consultation requirement and take prohibitions, do not apply to OC coho.

In response to the *Alsea* ruling, NOAA Fisheries released its revised policy for considering hatchery stocks when making listing decisions on June 3, 2004 (69 FR 31354). NOAA Fisheries completed a new review of the biological status of OC coho salmon, and applying the new hatchery listing policy, proposed to list OC coho salmon as a threatened species on June 14, 2004 (69 FR 33102). NOAA Fisheries must make a final decision on the proposed OC coho salmon listing by June 14, 2005.

OC coho salmon are known to spawn and rear in the Cow Creek watershed. Adult coho salmon enter Cow Creek in late September and spawn from October through January, with the majority of spawning activity occurring in small, low gradient tributaries. Coho salmon use Cow Creek within the project area primarily as a migration corridor, although some spawning and rearing

does occur within this area. The downstream migration of coho salmon smolts typically occurs from early February through May, but may extend into June.

2.1.2 Evaluating Proposed Actions

The standards for determining jeopardy are set forth in section 7(a)(2) of the ESA as defined by 50 CFR Part 402 (the consultation regulations). In conducting analyses of habitat-altering actions under section 7 of the ESA, NOAA Fisheries uses the following steps of the consultation regulations combined with the Habitat Approach (NMFS 1996): (1) Consider the status and biological requirements of the species; (2) evaluate the relevance of the environmental baseline in the action area to the species' current status; (3) determine the effects of the proposed or continuing action on the species and whether the action is consistent with the available recovery strategy; (4) consider cumulative effects; and (5) determine whether the proposed action, in light of the above factors, is likely to appreciably reduce the likelihood of species survival in the wild or destroy or adversely modify critical habitat. In completing this step of the analysis, NOAA Fisheries determines whether the action under consultation, together with cumulative effects when added to the environmental baseline, is likely to jeopardize the ESA-listed species or result in the destruction or adverse modification of critical habitat. If either or both are found, NOAA Fisheries will identify reasonable and prudent alternatives for the action that avoid jeopardy or destruction or adverse modification of critical habitat.

2.1.3 Biological Requirements

The first step in the methods NOAA Fisheries uses for applying the ESA section 7(a)(2) to listed coho salmon is to define the species' biological requirements that are most relevant to each consultation. NOAA Fisheries also considers the current status of the listed species, taking into account population size, trends, distribution and genetic diversity. To assess the current status of the listed species, NOAA Fisheries starts with the determinations made in its decision to list OC coho salmon for ESA protection and also considers new available data that is relevant to the determination.

The relevant biological requirements are those necessary for OC coho salmon to survive and recover to naturally-reproducing population levels, at which time protection under the ESA would become unnecessary. Adequate population levels must safeguard the genetic diversity of the listed stock, enhance their capacity to adapt to various environmental conditions, and allow them to become self-sustaining in the natural environment.

For this consultation, the biological requirements are improved habitat characteristics that function to support successful migration and holding in the action area. The current status of the OC coho salmon, based upon their risk of extinction, has not significantly improved since the species was listed. Cow and Quines Creeks serve as adult and juvenile migration corridor, as well as spawning and juvenile rearing habitat.

2.1.4 Environmental Baseline

The current range-wide status of the identified ESU may be found in Nickelson *et al.* (1992) and Weitkamp *et al.* (1995). The identified action would occur within the range of OC coho salmon. The action area is the area directly and indirectly affected by the action. The direct effects occur at the project site, and may extend upstream or downstream based on the potential for impairing fish passage, hydraulics, sediment, and pollutant discharge, and the extent of riparian habitat modifications. Indirect effects may occur throughout the watershed where actions described in this Opinion lead to additional activities or affect ecological functions contributing to stream degradation. As such, the action area for the proposed activity includes the immediate area where the Cow and Quines Creek Bridges Replacement Project would occur, and those areas upstream and downstream that may reasonably be affected, temporarily or in the long term. For the purposes of this Opinion, the action area is defined as the channel and adjacent riparian areas approximately 150 feet upstream and downstream from the project site. Temporary indirect effects, such as disruption of primary productivity and food resources, and potential direct effects, such as sediment, pollutant discharge and hydraulics, to Cow and Quines Creeks would be caused by the in-water work.

The dominant land uses in the Cow Creek watershed are residential, agricultural (private), forestry, and recreation. Cow Creek is water-deficient, primarily due to the seasonal pattern of rainfall and the demand for water for residential and agricultural irrigation. The Oregon Department of Environmental Quality (ODEQ) has listed Cow Creek on their 303(d) List of Water Quality Limited Water Bodies (303(d) list). The ODEQ-listed water quality problem identified within the project area include summer-time temperature (ODEQ 1999).

Based on the best available information regarding the current status of OC coho salmon range-wide, the population status, trends, genetics, and the poor environmental baseline conditions within the action area, NOAA Fisheries concludes that the biological requirements of OC coho salmon are not currently being met. Degraded habitat, resulting from agricultural practices, forestry practices, road building, and residential construction indicate that many aquatic habitat indicators are not properly functioning within the Cow Creek watershed. Actions that do not maintain or restore properly functioning aquatic habitat conditions would be likely to jeopardize the continued existence of OC coho salmon.

2.1.5 Analysis of Effects

The following elements of the proposed action may adversely affect OC coho salmon:

<u>Construction Equipment</u>
Accidental release of fuel, oil, and other contaminants may occur. Operation of back-hoes, excavators, cranes, and other equipment requires the use of fuels, lubricants, *etc.*, which, if spilled into a waterbody channel, or into the adjacent riparian zone, can injure or kill aquatic organisms. Petroleum-based contaminants, such as fuel, oil, and some hydraulic fluids, contain polycyclic aromatic hydrocarbons (PAHs), which can be acutely toxic to salmonids at high

levels of exposure and can also cause chronic lethal and acute and chronic sublethal effects to aquatic organisms (Neff 1985). To minimize the potential of pollutants entering the waterway, construction equipment, materials and refueling would be staged at least 150 feet from the OHWM.

Sedimentation

Potential sedimentation impacts to OC coho salmon from the proposed actions include both direct and indirect effects. Potential direct effects include mortality from exposure to suspended sediments (turbidity) and contaminants resulting from construction. Potential indirect effects include behavioral changes resulting from elevated turbidity levels (Berg and Whitman *et al.* 1982, Gregory 1988).

The influences of suspended sediment and turbidity to fish reported in the literature range from beneficial to detrimental. Elevated total suspended solids (TSS) conditions have been reported to enhance cover conditions, reduce piscivorus fish/bird predation rates, and improve survival. Elevated TSS conditions have also been reported to cause physiological stress, reduce growth, and adversely affect survival. Of key importance in considering the detrimental effects of TSS on fish is the frequency and the duration of the exposure, not just the TSS concentration.

Behavioral avoidance of turbid waters by salmonids may be one of the most significant effects of suspended sediments (DeVore *et al.* 1980, Scannell 1988). Salmonids have been observed to move laterally and downstream to avoid turbidity plumes (Lloyd 1987, Scannell 1988). Juvenile salmonids tend to avoid streams that are chronically turbid, such as glacial streams or those disturbed by human activities, unless the fish need to traverse these streams along migration routes (Lloyd *et al.* 1987). In addition, a documented positive effect is providing refuge and cover from predation (Gregory and Levings 1998).

Fish that remain in turbid, or elevated TSS, waters experience a reduction in predation from piscivorus fish and birds (Gregory and Levings 1998). In systems with intense predation pressure, this provides a beneficial trade off (*e.g.*, enhanced survival) to the cost of potential physical effects (*e.g.*, reduced growth). Turbidity levels of about 23 Nephalometric Turbidity Units (NTU) have been found to minimize bird and fish predation risks (Gregory 1993). Exposure duration is a critical determinant of the occurrence and importance of physical or behavioral effects. Salmonids have evolved in systems that periodically experience short-term pulses (days to weeks) of high suspended sediment loads, often associated with flood events, and are adapted to such high pulse exposures. Adult and larger juvenile salmonids may be little affected by the high concentrations of suspended sediments that occur during storm and snow melt runoff episodes (Bjornn and Reiser 1991). However, research shows that chronic exposure can cause physiological stress responses that can increase maintenance energy and reduce feeding and growth (Redding *et al.* 1987, Lloyd 1987, Servizi and Martens 1991).

Turbidity, at moderate levels, has the potential to adversely affect primary and secondary productivity, and at high levels, has the potential to injure and kill adult and juvenile fish, and may also interfere with feeding (Spence *et al.* 1996). Newly-emerged salmonid fry may be

vulnerable to even moderate amounts of turbidity (Bjornn and Reiser 1991). Other behavioral effects on fish, such as gill-flaring and feeding changes, have been observed in response to pulses of suspended sediment (Berg and Northcote 1985). Fine, redeposited sediments also have the potential to adversely affect primary and secondary productivity (Spence *et al.* 1996), and to reduce incubation success (Bell 1991) and cover for juvenile salmonids (Bjornn and Reiser 1991). Because the potential for turbidity should be localized and brief, and the potential for fish presence is minimal, the probability of direct mortality is negligible.

Construction-related effects necessary to complete the proposed action would be minimized by implementation of effective erosion and pollution control measures, and completing all work below ordinary high water during the NOAA Fisheries-approved in-water work period.

Direct Harm Due to Steel Pile Driving

The project will require the installation of approximately 30 piles for support of the temporary work bridges and falsework within the wetted channel. These piles will be hollow steel and will be installed via a vibratory hammer or an impact hammer. It is anticipated that the majority of the piles will be installed with an impact hammer.

Biological effects to coho salmon may result from the high sound pressure waves produced when driving piles with an impact hammer. Impact driving of steel piles can produce intense sound pressure waves that can injure and kill fishes.[1] The injuries caused by such pressure waves are known as barotraumas, and cause hemorrhage and rupture of internal organs, including the swimbladder and kidneys, and damage to the auditory system. Death can be instantaneous, can occur within minutes after exposure, or several days later. Fishes with swimbladders (which include salmonids) are sensitive to underwater impulsive sounds, *i.e.* sounds with a sharp sound pressure peak occurring in a short interval of time, because of swimbladder resonance, which is believed to occur in the frequency band of most sensitive hearing (usually 200 to 800 Hz) (Caltrans 2002). As the pressure wave passes through a fish, the swimbladder is rapidly squeezed due to the high pressure and then rapidly expanded as the underpressure component of the wave passes through the fish. The pneumatic pounding may result in the rupture of capillaries in the internal organs as indicated by observed blood in the abdominal cavity, and maceration of the kidney tissues (Caltrans 2002).

Another mechanism of injury and death is "rectified diffusion", which is the formation and growth of bubbles in tissue caused by regions of high sound pressure levels. Hastings (2002) expects little to no physical damage to aquatic animals for peak sound pressures below 190 decibels (dB) (re: 1 Pascal), the threshold for rectified diffusion. However, much uncertainty exists as to the level of adverse effects to fish exposed to sound between 180 and 190 dB_{peak} due to species-specific variables. Based on this information, NOAA Fisheries has established the threshold for physical harm at 180 dB_{peak} for this project.

[1] Telephone conversation with John Stadler, NOAA Fisheries (November 30, 2003) (discussion of impacts of pile driving on salmonids).

Sound pressure levels expressed as "root-mean-squared" (rms) values are commonly used in behavioral studies. Sound pressure levels in excess of 150 dB_{rms} are expected to cause temporary behavioral changes such as elicitation of a startle response or behavior associated with stress. These sound pressure levels are not expected to cause direct permanent injury, but, as discussed above, may decrease a fish's ability to avoid predators. Observations by Feist, *et al.* (1992) suggest that sound levels in this range may disrupt normal migratory behavior of juvenile salmon. They also noted that when exposed to the sounds from pile driving, juvenile pink and chum salmon were less likely to startle and flee when approached by an observer than were those that were shielded from the sounds. Based on this information, NOAA Fisheries has established the threshold for behavioral disruption at 150 dB_{rms} for this project.

Driving hollow steel piles of the size proposed for this project can produce sound pressure levels measured at 10m from the pile, over 180 dB_{peak} and 150 rms.[2] Clearly, these sound pressure levels are sufficiently high to present a lethal threat to fishes, as evidenced by the number of species, including salmonids, killed during impact driving of 24- and 36-inch diameter steel piles (NOAA Fisheres, 2001b). Vibratory hammers produce peak pressures that are approximately 17 dB lower than those from impact hammers (Nedwell and Edwards 2002), yielding an estimated peak sound pressure level of 193 dB for the piles used in this project. While this is above the threshold for physical injury (180 dB), no fish kills have been linked to the use of vibratory hammers. The lack of evidence does not mean that vibratory hammers are harmless, but they are likely less harmful than impact hammers.

The sounds from the two types of hammers differ not only in intensity, but also in frequency and impulse energy (the rate at which the pressure rises) as well. Most of the sound energy of impact hammers is concentrated between 100 and 800 Hz, the frequencies thought to be most harmful to fishes, while the sound energy from the vibratory hammer is concentrated around 20 to 30 Hz (Nedwell and Edwards 2002).

Just as these two sounds are different, so are the behavioral responses of fishes to them. Most of the energy in the sounds produced by vibratory hammers is at the frequency of vibration, around 20 to 30 Hz, very near the range of infrasound (less than 20 Hz). The response to impact hammers is, however, quite different. Fishes may react to the first few strikes of an impact hammer with a "startle" response. After these initial strikes, the startle response wanes and the fishes may remain within the field of a potentially harmful sound (NOAA Fisheries 2001). Thus, impact hammers may be more harmful than vibratory hammers for two reasons: first they produce pressure waves with greater potential to harm fishes and second, the sounds produced do not elicit an avoidance response in fishes, which will expose them for longer periods to those harmful pressures.

[2] Telephone conversation with John Stadler, NOAA Fisheries (November 30, 2003) (discussion of impacts of pile driving on salmonids).

Most reports of fish kills associated with pile driving are limited to those fishes that were immediately killed and floated to the surface. However, physical harm to juvenile salmonids is not always expected to result in immediate mortal injury, instead, death may occur several hours or days later, including some sublethal injuries.

Small fishes that are subjected to high sound pressure levels may also be more vulnerable to predation, and the predators, themselves, may be drawn into the potentially harmful field of sound by following injured prey. The California Department of Transportation (cited in NOAA Fisheries 2003) reported that the stomach of a striped bass killed by pile driving contained several freshly consumed juvenile herring. It appears this striped bass was feeding heavily on killed, injured, or stunned herring as it too swam into the zone of lethal sound pressure. Due to their piscivorus nature, adult salmonids may be drawn to an area of dangerously high sound pressure level by the smaller fishes that are injured or killed.

Not all fishes killed by pile driving float to the surface. With few exceptions, fish kills are reported only when dead and injured fishes are observed at the surface. Thus, the frequency and magnitude of such kills may be underestimated.

The potential for injury to fishes from pile driving depends on the type and intensity of the sounds produced. These are greatly influenced by a variety of factors, including the type of hammer, the type of substrate and the depth of the water. Firmer substrates require more energy to drive piles into, and produce more intense sound pressures.

Pile Removal

NOAA Fisheries expects that there will be short-term effects to OC coho salmon resulting from pile removal. Timing of the pile removal would occur during the designated in-water work period (June 15 to September 15). The short-term effects associated with pile removal will be increases in sedimentation and turbidity causing potential displacement of juvenile coho salmon. In addition, any in-water work has the potential to cause erosion from the streambank and turbidity in the river. Turbidity, at moderate levels, has the potential to adversely affect primary and secondary productivity, and at high levels, has the potential to injure and kill adult and juvenile fish, and may also interfere with feeding (Spence *et al.* 1996). Behavioral effects on fish, such as gill flaring and feeding changes, have been observed in response to pulses of suspended sediment. Localized increases of erosion/turbidity during in-water work could displace fish in the project area and disrupt normal behavior. These effects are expected to be temporary or non-existent and localized, depending on occupancy during construction and lasting until work is completed and any disturbed areas are stabilized.

Contaminated Water

Contaminated water will be generated from the construction of both the temporary work bridge, falsework platforms and the new bridges. Contaminated water, especially water with a high or low pH, has the potential to injure or kill fish. Contaminated water is defined as water with an increase in turbidity that is equal to or greater than 10% of background levels and/or water with a

pH greater than or less than one point of background levels. Contaminated water generated during construction will be contained and is not expected to have a measurable impact.

Water Quality Stormwater Effects

Stormwater from all four bridges currently drains directly into Cow and Quines Creeks via scuppers. The proposed stormwater treatment as stated in the BA would require all stormwater to be routed to the ends of the bridges, where it would flow overland. Due to the soil types it is likely that stormwater run-off from the bridges would completely infiltrate prior to entering the adjacent waterway. This would likely result in a decrease of pollutants to Cow and Quines Creeks.

Work Area Isolation and Fish Removal

Construction of the work bridge and falsework platform will require work area isolation from the flowing water. Fish removal activities will be in accordance with NOAA Fisheries' fish handling guidelines. Any ESA-listed fish removed from the isolated work area will experience high stress with the possibility of up to a 5% delayed mortality rate, depending on the rescue method.

Work area isolation can result in a loss of aquatic invertebrates due to dewatering or changes in water quality within the contained area. In addition, sediment-laden water created within isolated work areas could escape, resulting in impacts to the aquatic environment downstream from the project site.

The adverse effects of these activities on OC coho salmon and their riparian and aquatic habitats will be avoided or minimized by carrying out the conservation measures and construction approaches described in the BA (pages 21-28). For example, all in-water work will be completed during the in-water work window of June 15 to September15 to avoid sensitive coho salmon lifestages. Fish salvage activities will be in accordance with NOAA Fisheries' fish handling guidelines to reduce direct mortality of coho salmon. In addition, all concrete-laden water will be pumped from coffer dams to avoid pollutants from entering the waterway.

2.1.6 Cumulative Effects

Cumulative effects are defined in 50 CFR 402.02 as "those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation." The action area is defined as Cow and Quines Creeks, 1500 feet upstream and downstream from the Cow and Quines Creeks bridges.

Many actions occur within the Cow Creek Watershed, and within the action area itself. Between 1990 and 2000, the human population in Douglas County increased by 6.2%.[3] Thus, NOAA Fisheries assumes that future private and state actions would continue within the action area, but

[3] U.S. Census Bureau, State and County Quickfacts, Douglas County, Oregon. Available at http://quickfacts.census.gov/qfd/states/41/41019.html

at increasingly higher levels as population density increases. NOAA Fisheries assumes that future Federal transportation projects in the Cow Creek Watershed would be reviewed through separate section 7 consultation processes and therefore are not considered cumulative effects.

2.1.7 Conclusion

NOAA Fisheries determines that the addition of the effects of the FHWA's funding of the Cow and Quines Creek Bridges Replacement Project to the environmental baseline and the cumulative effects of other actions are not likely to jeopardize the continued existence of OC coho salmon. These conclusions are based on the following considerations: (1) All in-water work and other construction activities within the OHWM elevation would take place according to the in-water work period to protect fish and wildlife resources; (2) work area isolation (including use of NOAA Fisheries' guidelines for proper fish handling) and other conservation measures will be in place to avoid or minimize adverse affects to water quality; and (3) disturbance to both Cow and Quines Creeks will be minimized by following the conservation measures outlined in the BA. Therefore, the proposed action is not expected to prevent or delay the achievement of properly functioning habitat conditions within the action area.

2.1.8 Reinitiation of Consultation

As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained or is authorized by law and if: (1) The amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this Opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this Opinion; or (4) a new species is listed or critical habitat is designated that may be affected by the action. In instances where the amount or extent of authorized incidental take is exceeded, any operations causing such take must cease pending reinitiation of consultation.

2.2 Incidental Take Statement

The ESA at section 9 [16 USC 1538] prohibits take of endangered species. The prohibition of take is extended to threatened anadromous salmonids by section 4(d) rule [50 CFR 223.203]. Take is defined by the statute as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." [16 USC 1532(19)] Harm is defined by regulation as "an act which actually kills or injures fish or wildlife. Such an act may include significant habitat modification or degradation which actually kills or injures fish or wildlife by significantly impairing essential behavior patterns, including, breeding, spawning, rearing, migrating, feeding or sheltering." [50 CFR 222.102] Harass is defined as "an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering." [50 CFR 17.3] Incidental take is defined as "takings that result from, but are not the purpose of, carrying out an otherwise lawful activity conducted by

the Federal agency or applicant." [50 CFR 402.02] The ESA at section 7(o)(2) removes the prohibition from any incidental taking that is in compliance with the terms and conditions specified in a section 7(b)(4) incidental take statement [16 USC 1536].

The incidental take statement included in this conference opinion does not become effective until NOAA Fisheries adopts this conference opinion as a biological opinion, after the listing is final. Until the time that the species is listed, the prohibitions of the ESA do not apply.

2.2.1 Amount and Extent of the Take

NOAA Fisheries anticipates that the action covered by this Opinion is reasonably certain to result in incidental take of OC coho salmon because of detrimental effects from increased sediment levels (non-lethal), the potential for direct incidental take during the work area isolation, and delayed mortality due to handling during the fish removal process. Effects of actions such as the increased sediment levels are largely unquantifiable in the short term, and are not expected to be measurable as long-term harm to habitat features or by long-term harm to OC coho salmon behavior or population levels. There is also potential for take due to effects associated with driving steel piles with an impact hammer. Sound attenuation devices will minimize this take, however, some low-level take could still occur. In addition, due to the meandering characteristic of the Cow Creek channel within the project limits, the potential effects associated with driving steel pilings is expected to extend approximately 150 feet both up and downstream of the project area. Therefore, even though NOAA Fisheries expects some low-level incidental take to occur due to the actions covered by this Opinion, the best scientific and commercial data available are not sufficient to enable NOAA Fisheries to estimate a specific amount of incidental take to the species itself. In instances such as these, the NOAA Fisheries designates the expected level of take as "unquantifiable." Based on the information in the BA, NOAA Fisheries anticipates that an unquantifiable amount of incidental take within 150 feet up and downstream of the project limits is reasonably certain to occur as a result of the actions covered by this Opinion.

In addition, NOAA Fisheries expects that the possibility exists for handling OC coho salmon during the work isolation process, which will result in incidental take to individuals during the construction period. NOAA Fisheries anticipates that incidental take of up to 100 juvenile OC coho salmon (95 non-lethal and 5 lethal) could occur as a result of the fish removal process. These estimates are based on approximately 150 ft^2 of stream habitat that will be dewatered during work area isolation in Cow Creek. The extent of the take includes the streambed, streambank and riparian corridor of Cow and Quines Creek, extending approximately 150 feet up and downstream of the project limits.

2.2.2 Reasonable and Prudent Measures

The measures described below are non-discretionary. They must be implemented so that they become binding conditions in order for the exemption in section 7(a)(2) to apply. The FHWA has the continuing duty to regulate the activities covered in this incidental take statement. If the

FHWA fails to require ODOT to adhere to the terms and conditions of the incidental take statement through enforceable terms added to the document authorizing this action, or fails to retain the oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

The Cow and Quines Creek Bridges Replacement Project includes a set of "conservation measures" designed to minimize take of ESA-listed species. These are described on pages 21 to 28 of the BA. Specific measures for in-water and bank work, clearing and grubbing, bridge replacement, pile driving, erosion control, hazardous materials, and site-specific conservation and habitat remediation measures are also included.

NOAA Fisheries believes that the following reasonable and prudent measures, along with the conservation measures described in the BA, are necessary and appropriate to minimize the likelihood of take of ESA-listed fish resulting from implementation of this Opinion.

The FHWA shall:

1. Ensure completion of a comprehensive monitoring and reporting program to confirm this Opinion is meeting its objective of minimizing take from permitted activities.

2. Avoid or minimize incidental take from construction-related activities by applying permit conditions that require construction, operation and maintenance actions with minimum harm to aquatic and riparian systems.

3. Avoid or minimize the likelihood of incidental take from in-water work by ensuring that in-water work areas are isolated from flowing water.

4. Avoid or minimize the likelihood of incidental take caused by impact-driving of steel piles.

5. Avoid or minimize the amount and extent of take from loss of instream habitat by implementing measures to minimize impacts to riparian and instream habitat, or where impacts are unavoidable, to replace or restore lost riparian and instream functions.

2.2.3 Terms and Conditions

1. To implement reasonable and prudent measure #1 (monitoring), the FHWA shall ensure that:

a. Salvage notice. The following notice is included as a permit condition.

> NOTICE. If a sick, injured or dead specimen of a threatened or endangered species is found, the finder must notify the Roseburg Field Office of NOAA Fisheries Law Enforcement at 541-957-3388. The finder must take care in handling of sick or injured specimens to ensure effective treatment, and in handling dead specimens to preserve biological material in the best possible condition for later analysis of cause of death. The finder also has the responsibility to carry out instructions provided by Law Enforcement to ensure that evidence intrinsic to the specimen is not disturbed unnecessarily.

b. Written planning requirements. Before beginning any work below bankfull elevation,[4] the permittee will provide a copy of the written plans for site restoration, compensatory mitigation, pollution and erosion control, bridge demolition and stormwater management, to the Oregon Office of NOAA Fisheries at the following address. Plan requirements are described below.

> Director, Oregon State Habitat Office
> Habitat Conservation Division
> National Marine Fisheries Service
> **Attn: 2003/01384**
> 525 NE Oregon Street
> Portland, OR 97232

c. Implementation monitoring report required. The permittee submits an implementation monitoring report to the FHWA and to NOAA Fisheries, at the address below, within 120 days of completing all in-water work. The monitoring report will describe the permittee's success meeting his or her permit conditions.

d. Implementation monitoring report contents. Each monitoring report will include the following information.

   i. Project identification
      (1) Permittee name, permit number, and project name.
      (2) Project location, including any compensatory mitigation site(s), by 5th field HUC and by latitude and longitude as determined from the appropriate USGS 7-minute quadrangle map.
      (3) FHWA contact person.
      (4) Starting and ending dates for work completed.

[4] 'Bankfull elevation' means the bank height inundated by a 1.5 to 2-year average recurrence interval and may be estimated by morphological features such average bank height, scour lines and vegetation limits.

ii. Habitat conditions. Photos of habitat conditions at the project and any compensation site or sites, before, during, and after project completion.[5]
   (1) Include general views and close-ups showing details of the project and project area, including pre and post construction.
   (2) Label each photo with date, time, project name, photographer's name, and a comment about the subject.

iii. Site restoration and compensatory mitigation.
   (1) The name and address of the party(s) responsible for meeting each component of the site restoration and compensatory mitigation plan.
   (2) Performance standards for determining compliance.
   (3) Any other pertinent requirements such as financial assurances, real estate assurances, monitoring programs, and the provisions for short and long-term maintenance of the restoration or mitigation site.
   (4) Planting composition and density.
   (5) A plan to inspect and, if necessary, replace failed plantings for five years.
   (6) A provision for FHWA certification that all action necessary to carry out each component of the restoration or mitigation plan is completed, and that the performance standards are achieved.

iv. Project data.
   (1) Work cessation. Dates work ceased due to high flows, if any.
   (2) Fish screen. Evidence of compliance with NOAA Fisheries' fish screen criteria.
   (3) Pollution control. A summary of pollution and erosion control inspections, including any erosion control failure, contaminant release, and correction effort.
   (4) Pilings.
      (a) Number and type of pilings removed, including the number of pilings (if any) that broke during removal.
      (b) Number, type, and diameter of any pilings installed (*e.g.*, untreated wood, treated wood, hollow steel).
      (c) Description of how pilings were installed and any sound attenuation measures used.
   (5) Site preparation.
      (a) Total cleared area – riparian and upland.
      (b) Total new impervious area.
   (6) Isolation of in-water work area, capture and release.
      (a) Supervisory fish biologist – name and address.

[5] Relevant habitat conditions may include characteristics of channels, eroding and stable streambanks in the project area, riparian vegetation, water quality, flows at base, bankfull and over-bankfull stages, and other visually discernable environmental conditions at the project area, and upstream and downstream of the project.

(b) Methods of work area isolation and take minimization.
(c) Stream conditions before, during and within one week after completion of work area isolation.
(d) Means of fish capture.
(e) Number of fish captured by species.
(f) Release site and condition of all fish released.
(g) Any incidence of observed injury or mortality of listed species.

(7) Road construction, repairs and improvements. The justification for any new permanent road crossing design (*i.e.*, road realignment, full-span bridge, streambed simulation, or no-slope design culvert).

(8) Site restoration. Photo or other documentation that site restoration performance standards were met.

(9) Compensatory mitigation. The same elements apply as for monitoring site restoration.

e. Annual report on site restoration and compensatory mitigation monitoring. In addition to the 120-day implementation report, the permittee will submit an annual report to the FHWA and NOAA Fisheries by December 31 that includes the date of each visit to a restoration site or mitigation site, site conditions on that date, and any corrective action taken as a result of that visit. Reporting will continue from year to year until the FHWA certifies that site restoration or compensatory mitigation performance standards have been met.

f. Post construction impacts. The FHWA/ODOT shall assess the project's impacts, temporary and permanent, and compare them to the impacts assessed in the 2003 BA. This written assessment will be provided to NOAA Fisheries for review. If the actual impacts exceed those outlined in the BA then the FHWA/ODOT will provide additional mitigation to offset those impacts.

g. Reinitiation contact. To reinitiate consultation, contact the Oregon State Habitat Office of NOAA Fisheries at the address above.

2. To implement reasonable and prudent measure #2 (construction-related activities), the FHWA shall:

a. Minimum area. Confine construction impacts to the minimum area necessary to complete the project.

b. Preconstruction meeting. ODOT will arrange a pre-construction meeting with NOAA Fisheries and the contractor before commencement of project activities.

c. Preconstruction activity. Complete the following actions before significant[6] alteration of the project area.

i. Marking. Flag the boundaries of clearing limits associated with site access and construction to prevent ground disturbance of critical riparian

[6] 'Significant' means an effect can be meaningfully measured, detected or evaluated.

vegetation, wetlands and other sensitive sites beyond the flagged boundary. Survey and mark the OHWM at the project site before commencement of work.

ii. Emergency erosion controls. Ensure that the following materials for emergency erosion control are onsite.
   (1) A supply of sediment control materials (*e.g.*, silt fence, straw bales[7]).
   (2) An oil-absorbing, floating boom whenever surface water is present.

iii. Temporary erosion controls. All temporary erosion controls will be in-place and appropriately installed downslope of project activity within the riparian area until site restoration is complete.

d. Site preparation. Conserve native materials for site restoration.
   i. If possible, leave native materials where they are found.
   ii. If materials are moved, damaged or destroyed, replace them with a functional equivalent during site restoration.
   iii. Stockpile any large wood,[8] native vegetation, weed-free topsoil, and native channel material displaced by construction for use during site restoration.

e. Earthwork. Complete earthwork, including drilling, excavation, dredging, filling and compacting, as quickly as possible.
   i. Site stabilization. Stabilize all disturbed areas, including obliteration of temporary roads, following any break-in work unless construction will resume within four days.
   ii. Source of materials. Obtain boulders, rock, woody materials and other natural construction materials used for the project outside the riparian area.

f. Cessation of work. Cease project operations under high flow conditions that may result in inundation of the project area, except for efforts to avoid or minimize resource damage.

g. Timing of in-water work. Complete all work below the OHWM between July 1 and September 15, unless otherwise approved in writing by NOAA Fisheries. ODOT shall notify NOAA Fisheries at least one week before the start of work below the OHWM.

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[7] When available, certified weed-free straw or hay bales will be used to prevent introduction of noxious weeds.

[8] For purposes of this Opinion only, 'large wood' means a tree, log, or rootwad big enough to dissipate stream energy associated with high flows, capture bedload, stabilize streambanks, influence channel characteristics, and otherwise support aquatic habitat function, given the slope and bankfull channel width of the stream in which the wood occurs. See, Oregon Department of Forestry and Oregon Department of Fish and Wildlife, *A Guide to Placing Large Wood in Streams*, May 1995 (www.odf.state.or.us/FP/RefLibrary/LargeWoodPlacemntGuide5-95.doc).

h. Fish screens. Install, operate and maintain a fish screen according to NOAA Fisheries' fish screen criteria[9] on each water intake used for project construction, including pumps used to isolate an in-water work area. Screens for water diversions or intakes that will be used for irrigation, municipal or industrial purposes, or any use besides project construction are not authorized.

i. Fish passage. Provide passage for any adult or juvenile salmonid species present in the project area during construction, unless otherwise approved in writing by NOAA Fisheries, and after construction for the life of the project. Upstream passage is not required during construction if it did not previously exist.

j. Pollution and Erosion Control Plan. Prepare and carry out a written pollution and erosion control plan to prevent pollution caused by surveying or construction operations. Submit a copy of the written plan to the FHWA and to the Oregon State Habitat Office of NOAA Fisheries, at the address above, before beginning work below bankfull elevation.

   i. Plan Contents. The pollution and erosion control plan will contain the pertinent elements listed below, and meet requirements of all applicable laws and regulations.

      (1) The name and address of the party(s) responsible for accomplishment of the pollution and erosion control plan.

      (2) Practices to prevent erosion and sedimentation associated with access roads, stream crossings, drilling sites, construction sites, borrow pit operations, haul roads, equipment and material storage sites, fueling operations, staging areas, and roads being decommissioned.

      (3) Practices to confine, remove and dispose of excess concrete, cement, grout, and other mortars or bonding agents, including measures for washout facilities.

      (4) A description of any regulated or hazardous products or materials that will be used for the project, including procedures for inventory, storage, handling, and monitoring.

      (5) A spill containment and control plan with notification procedures, specific cleanup and disposal instructions for different products, quick response containment and cleanup measures that will be available on the site, proposed methods for disposal of spilled materials, and employee training for spill containment.

      (6) Practices to prevent construction debris from dropping into any stream or water body, and to remove any material that does drop with minimum disturbance to the streambed and water quality.

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[9] National Marine Fisheries Service, *Juvenile Fish Screen Criteria* (revised February 16, 1995) and *Addendum: Juvenile Fish Screen Criteria for Pump Intakes* (May 9, 1996) (guidelines and criteria for migrant fish passage facilities, and new pump intakes and existing inadequate pump intake screens) (http://www.nwr.noaa.gov/1hydrop/hydroweb/ferc.htm).

ii. Inspection of erosion controls. During construction, monitor instream turbidity and inspect all erosion controls daily during the rainy season and weekly during the dry season, or more often as necessary, to ensure the erosion controls are working adequately.[10]

(1) If monitoring or inspection shows that the erosion controls are ineffective, mobilize work crews immediately to make repairs, install replacements, or install additional controls as necessary.

(2) Remove sediment from erosion controls once it has reached 1/3 of the exposed height of the control.

k. Construction discharge water. Treat all discharge water created by construction (*e.g.*, concrete washout, pumping for work area isolation, vehicle wash water, drilling fluids) as follows.

i. Water quality. Design, build and maintain facilities to collect and treat all construction discharge water, including any contaminated water produced by drilling, using the best available technology applicable to site conditions. Provide treatment to remove debris, nutrients, sediment, petroleum hydrocarbons, metals and other pollutants likely to be present.

ii. Discharge velocity. If construction discharge water is released using an outfall or diffuser port, velocities may not exceed 4 feet per second, and the maximum size of any aperture may not exceed one inch.

iii. Pollutants. Do not allow pollutants including green concrete, contaminated water, silt, welding slag, sandblasting abrasive, or grout cured less than 24 hours to contact any wetland or the OHWM.

l. Piling removal. If a temporary or permanent piling will be removed, the following conditions apply.

i. Dislodge the piling with a vibratory hammer.

ii. Once loose, place the piling onto an appropriate dry storage site.

iii. Fill the holes left by each piling with clean, native sediments, whenever feasible.

m. Temporary access roads. All temporary access roads will be constructed as follows.

i. Existing ways. Use existing roadways and travel paths whenever possible, unless construction of a new way would result in less habitat take.

ii. Steep slopes. Temporary roads built mid-slope or on slopes steeper than 30% are not authorized.

iii. Minimizing soil disturbance and compaction. Minimize soil disturbance and compaction whenever a new temporary road is necessary within 150

[10] 'Working adequately' means that project activities do not increase ambient stream turbidity by more than 10% above background 100 feet below the discharge, when measured relative to a control point immediately upstream of the turbidity causing activity.

feet[11] of a stream, waterbody or wetland by clearing vegetation to ground level and placing clean gravel over geotextile fabric, unless otherwise approved in writing by NOAA Fisheries.

iv. Temporary stream crossings.
  (1) Minimize the number of temporary stream crossings.
  (2) Design temporary road crossings as follows.
    (a) Survey and map any potential spawning habitat within 300 feet downstream of a proposed crossing.
    (b) Do not place a stream crossing at known or suspected spawning areas, or within 300 feet upstream of such areas if spawning areas may be affected.
    (c) Design the crossing to provide for foreseeable risks (*e.g.*, flooding and associated bedload and debris, to prevent the diversion of streamflow out of the channel and down the road if the crossing fails).
    (d) Vehicles and machinery will cross riparian areas and streams at right angles to the main channel wherever possible.

v. Obliteration. When the project is complete, obliterate all temporary access roads that will not be in footprint of a new bridge or other permanent structure, stabilize the soil, and revegetate the site. Abandon and restore temporary roads in wet or flooded areas by the end of the in-water work period.

n. Bridge Demolition. A bridge demolition plan must be approved by NOAA Fisheries before removal of the existing structures.

o. Bridge Containment. The work bridges will have containment measures in place that minimizes any potential of petrochemicals or hazardous materials from entering the river.
  i. The decking of the work bridge shall be constructed to self-contain petrochemicals and hazardous materials.
  ii. The work bridges and the containment structure will be maintained to preserve containment integrity throughout the term of the project.

p. Heavy Equipment. Restrict use of heavy equipment as follows.
  i. Choice of equipment. When heavy equipment will be used, the equipment selected will have the least adverse effects on the environment (*e.g.*, minimally-sized, low ground pressure equipment).
  ii. Vehicle and material staging. Store construction materials, and fuel, operate, maintain and store vehicles as follows.

[11] Distances from a stream or wate body are measured horizontally from, and perpendicular to, the bankfull elevation, the edge of the channel migration zone, or the edge of any associated wetland, whichever is greater. 'Channel migration zone' means the area defined by the lateral extent of likely movement along a stream reach as shown by evidence of active stream channel movement over the past 100 years (*e.g.*, alluvial fans or floodplains formed where the channel gradient decreases, the valley abruptly widens, or at the confluence of larger streams).

(1) To reduce the staging area and potential for contamination, ensure that only enough supplies and equipment to complete a specific job will be stored on site.

(2) Complete vehicle staging, cleaning, maintenance, refueling, and fuel storage in a vehicle staging area placed 150 feet or more from any stream, waterbody, or wetland, unless otherwise approved in writing by NOAA Fisheries, except as stated below.

(a) Fuel storage locations within 150 feet of the OHWM shall have containment measures in place that meets or exceeds 100% containment.

(b) No auxiliary fuel tanks are stored within 150 feet of the OHWM.

(3) No hazardous materials will be stored on the work bridge.

(4) Hazardous materials stored within 150 feet of the OHWM shall have containment measures in place that meets or exceeds 100% containment.

(5) Inspect all vehicles operated within 150 feet of any stream, waterbody or wetland daily for fluid leaks before leaving the vehicle staging area. Repair any leaks detected in the vehicle staging area before the vehicle resumes operation. Document inspections in a record that is available for review on request by FHWA or NOAA Fisheries.

(6) Before operations begin and as often as necessary during operation, steam clean all equipment that will be used below bankfull elevation until all visible external oil, grease, mud, and other visible contaminates are removed.

(7) Diaper all stationary power equipment (*e.g.*, generators, cranes, stationary drilling equipment) operated within 150 feet of any stream, waterbody or wetland to prevent leaks, unless suitable containment is provided to prevent potential spills from entering any stream or waterbody.

q. Site restoration. Prepare and carry out a written site restoration plan as necessary to ensure that all streambanks, soils and vegetation disturbed by the project are cleaned up and restored as follows. Submit a copy of the written site restoration plan to the FHWA and to the Oregon Office of NOAA Fisheries, at the address above, before beginning work below bankfull elevation.

i. General considerations.

(1) Restoration goal. The goal of site restoration is renewal of habitat access, water quality, production of habitat elements (*e.g.*, large woody debris), channel conditions, flows, watershed conditions and other ecosystem processes that form and maintain productive fish habitats.

(2) Streambank shaping. Restore damaged streambanks to a natural slope, pattern and profile suitable for establishment of permanent

woody vegetation, unless precluded by pre-project conditions (*e.g.*, a natural rock wall).

(3) Revegetation. Replant area requiring revegetation before the first April 15 following construction. Use a diverse assemblage of species native to the project area or region, including grasses, forbs, shrubs and trees. Noxious or invasive species may not be used.

(4) Pesticides. Take of ESA-listed species caused by any aspect of pesticide use is not included in the exemption to the ESA take prohibitions provided by this incidental take statement. Pesticide use must be evaluated in an individual consultation, although mechanical or other methods may be used to control weeds and unwanted vegetation.

(5) Fertilizer. Do not apply surface fertilizer within 50 feet of any stream channel.

(6) Fencing. Install fencing as necessary to prevent access to revegetated sites by livestock or unauthorized persons.

ii. Plan contents. Include each of the following elements.

(1) Baseline information. This information may be obtained from existing sources (*e.g.*, land use plans, watershed analyses, subbasin plans), where available.

(a) A functional assessment of adverse effects, *i.e.*, the location, extent and function of the riparian and aquatic resources that will be adversely affected by construction and operation of the project.

(b) The location and extent of resources surrounding the restoration site, including historic and existing conditions.

(2) Goals and objectives. Restoration goals and objectives that describe the extent of site restoration necessary to offset adverse effects of the project, by aquatic resource type.

(3) Performance standards. Use these standards to help design the site restoration plan and to assess whether the restoration goal is met. While no single criterion is sufficient to measure success, the intent is that these features should be present within reasonable limits of natural and management variation.

(a) Bare soil spaces are small and well-dispersed.

(b) Soil movement, such as active rills or gullies and soil deposition around plants or in small basins, is absent or slight and local.

(c) If areas with past erosion are present, they are completely stabilized and healed.

(d) Plant litter is well distributed and effective in protecting the soil with few or no litter dams present.

(e) Native woody and herbaceous vegetation, and germination microsites, are present and well distributed across the site.
(f) Vegetation structure is resulting in rooting throughout the available soil profile.
(g) Plants have normal, vigorous growth form, and a high probability of remaining vigorous, healthy and dominant over undesired competing vegetation.
(h) High impact conditions confined to small areas necessary access or other special management situations.
(i) Streambanks have less than 5% exposed soils with margins anchored by deeply rooted vegetation or coarse-grained alluvial debris.
(j) Few upland plants are in valley bottom locations, and a continuous corridor of shrubs and trees provide shade for the entire streambank.

(4) Work plan. Include a written work plan as part of the site restoration plan with sufficient detail to include a description of the following elements, as applicable.
(a) Boundaries for the restoration area.
(b) Restoration methods, timing, and sequence.
(c) Water supply source, if necessary.
(d) Woody native vegetation appropriate to the restoration site.[12] This must be a diverse assemblage of species that are native to the project area or region, including grasses, forbs, shrubs and trees. This may include allowances for natural regeneration from an existing seed bank or planting.
(e) A plan to control exotic invasive vegetation.
(f) Elevation(s) and slope(s) of the restoration area to ensure they conform with required elevation and hydrologic requirements of target plant species.
(g) Geomorphology and habitat features of stream or other open water.
(h) Site management and maintenance requirements.

(5) Five-year monitoring and maintenance plan.
(a) A written schedule to visit the restoration site annually for five years or longer as necessary to confirm that the performance standards are achieved. Despite the initial five-year planning period, site visits and monitoring will continue from year-to-year until the FHWA certifies that site restoration performance standards have been met.

[12] Use references sites to select vegetation for the mitigation site whenever feasible. Historic reconstruction, vegetation models, or other ecologically-based methods may also be used as appropriate.

(b) During each visit, inspect for and correct any factors that may prevent attainment of performance standards (*e.g.*, low plant survival, invasive species, wildlife damage, drought).

(c) Keep a written record to document the date of each visit, site conditions and any corrective actions taken.

3. To implement reasonable and prudent measure #3 (isolation of in-water work area) the FHWA shall ensure that:

a. Work area isolation. During in-water work (work within the OHWM), if the project involves either significant channel disturbance or use of equipment within the wetted channel, ensure that the work area is well isolated from the active flowing stream within a coffer dam (constructed of sand bags, sheet pilings, inflatable bags, *etc.*) or similar structure, to minimize the potential for sediment entrainment. Furthermore, no ground- or substrate-disturbing action will occur within the OHWM 150 feet upstream of potential spawning habitat as measured at the thalweg without isolation of the work area from flowing waters. After the coffer dam is in place, any fish trapped in the isolation pool will be removed by a permitted ODOT and/or ODFW biologist before de-watering, using ODFW-approved methods.

i. Coffer dams. All coffer dams will be of sufficient height to not be inundated during high flows.

ii. Water intake structures. Any water intake structure authorized under this Opinion must have a fish screen installed, and operated and maintained in accordance with NOAA Fisheries' fish screen criteria.

(1) Water pumped from the work isolation area will be discharged into an upland area providing over-ground flow before returning to the creek. Discharge will occur so that it does not cause erosion.

(2) Discharges into potential fish spawning areas or areas with submerged vegetation are prohibited.

iii. Fish Salvage. Before and intermittently during pumping to isolate an in-water work area, attempt to capture and release fish from the isolated area using trapping, seining, electrofishing, or other methods as are prudent to minimize risk of injury.

(1) The entire capture and release operation must be conducted or supervised by a fishery biologist experienced with work area isolation and competent to ensure the safe handling of all ESA-listed fish.

(2) Do not use electrofishing if water temperatures exceed 18^{o}C.

(3) If electrofishing equipment is used to capture fish, comply with NOAA Fisheries' electrofishing guidelines (NMFS 2000).

(4) Handle ESA-listed fish with extreme care, keeping fish in water to the maximum extent possible during seining and transfer procedures to prevent the added stress of out-of-water handling.

(5) Transport fish in aerated buckets or tanks.
(6) Release fish into a safe release site as quickly as possible, and as near as possible to capture sites.
(7) Do not transfer ESA-listed fish to anyone except NOAA Fisheries personnel, unless otherwise approved in writing by NOAA Fisheries (See Term and Condition 1a).
(8) Obtain all other Federal, state, and local permits necessary to conduct the capture and release activity.
(9) Allow NOAA Fisheries or its designated representative to accompany the capture team during the capture and release activity, and to inspect the team's capture and release records and facilities.

4. To implement reasonable and prudent measure #4, (steel pile driving) the FHWA shall ensure that:

a. The number and diameter of the pilings are minimized, as appropriate, without reducing the structural integrity.
b. The FHWA shall ensure that, providing substrate conditions are appropriate, vibratory hammers are used to drive piles when possible. If substrate conditions are not appropriate, impact hammers may be used. Impact hammers will require hydroacoustic monitoring and use of a bubble curtain if the pressure thresholds are exceeded, or the use of a bubble curtain without monitoring.
c. Drive each piling as follows to minimize the use of force and resulting sound pressure.
    i. When impact drivers will be used to install a pile, use the smallest driver and the minimum force necessary to complete the job. Use a drop hammer or a hydraulic impact hammer, whenever feasible and set the drop height to the minimum necessary to drive the piling.
    ii. When using an impact hammer to drive or proof steel piles, one of the following sound attenuation devices and methods will be used to reduce sound pressure levels by 20 dB.
        (1) Place a block of wood or other sound-dampening material between the hammer and the piling being driven.
        (2) If currents are 1.7 miles per hour or less, surround the piling to be driven by an unconfined bubble curtain that will distribute small air bubbles around 100% of the piling perimeter for the full depth of the water column.[13]

[13] For guidance on how to deploy an effective, economical bubble curtain, see, Longmuir, C. and T. Lively, *Bubble Curtain Systems for Use During Marine Pile Driving*, Fraser River Pile and Dredge LTD, 1830 River Drive, New Westminster, British Columbia, V3M 2A8, Canada. Recommended components include a high volume air compressor that can supply more than 100 pounds per square inch at 150 cubic feet per minute to a distribution manifold with 1/16 inch diameter air release holes spaced every 3/4 inch along its length. An additional distribution manifold is needed for

(3) If currents are greater than 1.7 miles per hour, surround the piling to be driven by a confined bubble curtain (*e.g.*, a bubble ring surrounded by a fabric or metal sleeve) that will distribute air bubbles around 100% of the piling perimeter for the full depth of the water column.
(4) Other sound attenuation devices as approved in writing by NOAA Fisheries.

5. To implement reasonable and prudent measure #5 (minimize loss of instream habitat), FHWA shall ensure that:

a. The distance between existing bridge approach fill and the 100-year flood plain or OHWM (whichever is closer to the existing fill) will not be reduced.
b. The amount of fill within the flood plain will be minimized.
c. Boundaries of the clearing limits associated with site access and construction will be flagged to prevent ground disturbance of riparian vegetation, wetlands, and other sensitive sites beyond the flagged boundary.
d. During excavation, native streambed material will be stockpiled out of the two-year flood plain for later use in back-filling the trenches used to construct coffer dams.
e. During project design ODOT will work to minimize the amount of riprap used. Where riprap is necessary, only clean, non-erodible, upland angular rock of sufficient size for long-term armoring will be employed. Riprap will not be "end-dumped" within the wetted channel.
f. Alteration or disturbance of streambanks and existing riparian vegetation will be minimized. Where bank work is necessary, bank protection material shall be placed to maintain normal waterway configuration whenever possible.
g. Measures will be taken to prevent any debris from falling within the boundaries of the OHWM. Any material that falls within this area will be removed in a manner that has a minimum impact to the riparian area, streambed and water quality.

3. MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

3.1 Background

The objective of the essential fish habitat (EFH) consultation is to determine whether the proposed action may adversely affect designated EFH for relevant species, and to recommend

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each 35 feet of water depth.

conservation measures to avoid, minimize, or otherwise offset potential adverse effects to EFH resulting from the proposed action.

3.2 Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-297), requires the inclusion of EFH descriptions in Federal fishery management plans. In addition, the MSA requires Federal agencies to consult with NOAA Fisheries on activities that may adversely affect EFH.

EFH means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (MSA §3). For the purpose of interpreting the definition of essential fish habitat: 'Waters' include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; 'substrate' includes sediment, hard bottom, structures underlying the waters, and associated biological communities; 'necessary' means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle (50CFR600.110).

Section 305(b) of the MSA (16 U.S.C. 1855(b)) requires that:

- Federal agencies must consult with NOAA Fisheries on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH.

- NOAA Fisheries shall provide conservation recommendations for any Federal or state activity that may adversely affect EFH.

- Federal agencies shall within 30 days after receiving conservation recommendations from NOAA Fisheries provide a detailed response in writing to NOAA Fisheries regarding the conservation recommendations. The response shall include a description of measures proposed by the agency for avoiding, mitigating, or offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with the conservation recommendations of NOAA Fisheries, the Federal agency shall explain its reasons for not following the recommendations.

The MSA requires consultation for all actions that may adversely affect EFH, and does not distinguish between actions within EFH and actions outside EFH. Any reasonable attempt to encourage the conservation of EFH must take into account actions that occur outside EFH, such as upstream and upslope activities, that may have an adverse effect on EFH. Therefore, EFH consultation with NOAA Fisheries is required by Federal agencies undertaking, permitting or funding activities that may adversely affect EFH, regardless of its location.

3.3 Identification of EFH

The Pacific Fisheries Management Council (PFMC) has designated EFH for three species of Pacific salmon: Chinook salmon (*Oncorhynchus tshawytscha*), coho salmon (*O. kisutch*), and Puget Sound pink salmon (*O. gorbuscha*) (PFMC 1999). Freshwater EFH for Pacific salmon includes all those streams, lakes, ponds, wetlands, and other water bodies currently, or historically accessible to salmon in Washington, Oregon, Idaho, and California, except areas upstream of certain impassable man-made barriers (as identified by the PFMC), and longstanding, naturally-impassable barriers (*i.e.*, natural waterfalls in existence for several hundred years). Detailed descriptions and identifications of EFH for salmon are found in Appendix A to Amendment 14 to the *Pacific Coast Salmon Plan* (PFMC 1999). Assessment of potential adverse effects to these species' EFH from the proposed action is based on this information.

3.4 Proposed Actions

The proposed actions are detailed in section 1.2. The action area is defined as both Cow and Quines Creeks, 1500 feet upstream and downstream of the bridges. This area has been designated as EFH for various life stages of coho salmon and chinook salmon.

3.5 Effects of Proposed Action

As described in detail in section 2.1.5, the proposed activities may result in detrimental short- and long-term adverse effects to a variety of habitat parameters. These impacts include increases in turbidity, disturbance of the beds and banks of the river, removal of riparian vegetation, and the potential for pollutants to enter the water.

3.6 Conclusion

NOAA Fisheries believes that the proposed action will adversely affect EFH for coho salmon and chinook salmon.

3.7 EFH Conservation Recommendations

Pursuant to section 305(b)(4)(A) of the MSA, NOAA Fisheries is required to provide EFH conservation recommendations for any Federal or state agency action that would adversely affect EFH. The conservation measures proposed for the project by the FHWA and all of the reasonable and prudent measures and the terms and conditions contained in sections 2.2.2 and 2.2.3 are applicable to salmon EFH. Therefore, NOAA Fisheries incorporates each of those measures here as EFH conservation recommendations.

3.8 Statutory Response Requirement

Please note that the MSA(section 305(b)) and 50 CFR 600.920(j) requires the Federal agency to provide a written response to NOAA Fisheries after receiving EFH conservation recommendations within 30 days of its receipt of this letter. This response must include a description of measures proposed by the agency to avoid, minimize, mitigate or offset the adverse impacts of the activity on EFH. If the response is inconsistent with a conservation recommendation from NOAA Fisheries, the agency must explain its reasons for not following the recommendation.

3.9 Supplemental Consultation

The FHWA must reinitiate EFH consultation with NOAA Fisheries if either the action is substantially revised or new information becomes available that affects the basis for NOAA Fisheries' EFH conservation recommendations (50 CFR 600.920).

4. LITERATURE CITED

Section 7(a)(2) of the ESA requires Opinions to be based on "the best scientific and commercial data available." This section identifies the data and references used in developing this Opinion.

Bell, M.C. 1991. Fisheries handbook of Engineering requirements and biological criteria. Fish Passage Development and Evaluation Program. U.S. Army Corps of Engineers. North Pacific Division.

Berg, L. and T.G. Northcote. 1985. "Changes In Territorial, Gill-Flaring, and Feeding Behavior in Juvenile Coho Salmon (Oncorhynchus kisutch) Following Short-Term Pulses of Suspended Sediment." Canadian Journal of Fisheries and Aquatic Sciences 42: 1410-1417.

Bjornn, T.C., and D.W. Reiser. 1991. Habitat requirements of salmonids in streams. Pages 83-138 *in* W.R. Meehan, ed. Influences of forest and rangeland management on salmonid fishes and their habitats. American Fisheries Society Special Publication 19:83-138.

Caltrans. 2002. Biological Assessment for the Benicia Martinez New Bridge Project for NOAA Fisheries. Prepared by Caltrans for U.S. Department of Transportation. October 2002. 37 pp.

DeVore, P. W., L. T. Brooke, and W. A. Swenson. 1980. "The Effects of Red Clay Turbidity and Sedimentation on Aquatic Life In the Nemadji River System. Impact of Nonpoint Pollution Control on Western Lake Superior." S. C. Andrews, R. G. Christensen, and C. D. Wilson. Washington, D.C., U.S. Environmental Protection Agency. EPA Report 905/9-79-002-B.

Gregory, R. S. 1988. Effects of Turbidity on benthic foraging and predation risk in juvenile chinook salmon. Pages 64-73 *In:* C. A. Simenstad (ed.) Effects of dredging on anadromous Pacific coast fishes. Washington Sea Grant Program. Washington State University. Seattle, Washington.

Gregory, R. S., and C. D. Levings. 1998. "Turbidity Reduces Predation on Migrating Juvenile Pacific Salmon." Transactions of the American Fisheries Society 127: 275-285.

Lloyd, D. S. 1987. Turbidity as a Water Quality Standard for Salmonid Habitats in Alaska. North American Journal of Fisheries Management 7:34-45.

Nedwell, J. and B. Edwards. 2002. Measurements of underwater noise in the Arun River during piling at County Warf, Littlehampton. Report by Subacoustech, Ltd. to David Wilson Homes, Ltd.

Neff, J.M. 1985. Polycyclic aromatic hydrocarbons. Pages 416-454 in G.M. Rand and S.R. Petrocelli. Fundamentals of aquatic toxicology,. Hemisphere Publishing, Washington, D.C.

Nickelson, T.E., J. W. Nicholas, A.M. McGie, R.B. Lindsay, D.L. Bottom, R.J. Kaiser, and S.E. Jacobs. 1992. Status of anadromous salmonids in Oregon coastal basins. Unpublished manuscript. Oregon Department of Fish and Wildlife, Research and Development Section, Corvallis, and Ocean Salmon Management, Newport. 83 pages.

NMFS (National Marine Fisheries Service). Guidelines for Electrofishing Waters Containing Salmonids Listed Under the Endangered Species Act. 2000. Protected Resources Division, Portland, Oregon, 5 pp.

NMFS (National Marine Fisheries Service). Making Endangered Species Act determinations of effect for individual and grouped actions at the watershed scale. Habitat Conservation Program, Portland, Oregon, 32 p.

NOAA Fisheries. 2001b. Biological Opinion for the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project. Southwest Region, Santa Rosa, California. Admin. Rec. 151422SWR99SR190.

ODEQ. 1999. 303(d) List of Water Quality Limited Water Bodies, EPA-approved list. http://www.deq.state.or.us/wq/303dlist/303dpage.htm

PFMC (Pacific Fishery Management Council), 1998a. Final Environmental Assessment/Regulatory Review for Amendment 11 to the Pacific Coast Groundfish Fishery Management Plan. October 1998.

PFMC (Pacific Fishery Management Council), 1998b. The Coastal Pelagic Species Fishery Management Plan: Amendment 8. December 1998.

PFMC (Pacific Fishery Management Council). 1999. *Amendment 14 to the Pacific Coast Salmon Plan*. Appendix A: Description and Identification of Essential Fish Habitat, Adverse Impacts and Recommended Conservation Measures for Salmon. Portland, Oregon.

Redding, J. M., C. B. Schreck, and F. H. Everest. 1987. "Physiological Effects on Coho Salmon and Steelhead of Exposure to Suspended Solids." Transactions of the American Fisheries Society 116: 737-744.

Scannell, P.O. 1988. Effects of Elevated Sediment Levels from Placer Mining on Survival and Behavior of Immature Arctic Grayling. Alaska Cooperative Fishery Unit, University of Alaska. Unit Contribution 27.

Servizi, J. A., and Martens, D. W. 1991. “Effects of Temperature, Season, and Fish Size on Acute Lethality of Suspended Sediments to Coho Salmon”. Canadian Journal of Fisheries and Aquatic Sciences 49:1389-1395.

Spence, B.C., G.A. Lomnicky, R.M. Hughes, and R.P. Novitzki. 1996. An Ecosystem Approach to Salmonid Conservation. TR-4501-96-6057.

Weitkamp, L.A., T.C. Wainwright, G.J. Bryant, G.B. Milner, D.J. Teel, R.G. Kope, and R.S. Waples. 1995. Status review of coho salmon from Washington, Oregon and California. National Marine Fisheries Service, Northwest Fisheries Science Center, Seattle, Washington.